



Designation: D746 – 20

Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact¹

This standard is issued under the fixed designation D746; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This test method covers the determination of the temperature at which plastics and elastomers (as defined by Terminology [D883](#)) exhibit brittle failure under specified impact conditions. Two routine inspection and acceptance procedures are also provided.

NOTE 1—When testing rubbers for impact brittleness use Test Method [D2137](#). When testing plastic sheeting for impact brittleness, use Test Method [D1790](#).

1.2 The values stated in SI units are to be regarded as the standard.

1.3 Due to the potential safety and environmental hazards associated with mercury-filled thermometers, the use of alternative temperature measuring devices (such as thermocouples and RTDs) is encouraged.

Warning—Mercury has been designated by many regulatory agencies as a hazardous material that can cause serious medical issues. Mercury, or its vapor, has been demonstrated to be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury containing products. See the applicable product Safety Data Sheet (SDS) for additional information. Users should be aware that selling mercury and/or mercury containing products into your state or country may be prohibited by law.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

NOTE 2—This test method and ISO 974 address the same subject matter, but differ in technical content.

1.5 *This international standard was developed in accordance with internationally recognized principles on standard-*

ization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

[D618 Practice for Conditioning Plastics for Testing](#)
[D832 Practice for Rubber Conditioning For Low Temperature Testing](#)
[D883 Terminology Relating to Plastics](#)
[D1790 Test Method for Brittleness Temperature of Plastic Sheet by Impact](#)
[D2137 Test Methods for Rubber Property—Brittleness Point of Flexible Polymers and Coated Fabrics](#)
[E1 Specification for ASTM Liquid-in-Glass Thermometers](#)
[E77 Test Method for Inspection and Verification of Thermometers](#)
[E608/E608M Specification for Mineral-Insulated, Metal-Sheathed Base Metal Thermocouples](#)
[E1137/E1137M Specification for Industrial Platinum Resistance Thermometers](#)

2.2 ISO Standard:

[ISO 974 Plastics—Determination of the Brittleness Temperature by Impact](#)³

3. Terminology

3.1 *General*—The definitions of plastics used in this test method are in accordance with Test Method [D883](#) unless otherwise specified.

3.2 *brittleness temperature*—that temperature, estimated statistically, at which 50 % of the specimens would probably fail.

¹ This test method is under the jurisdiction of ASTM Committee [D20](#) on Plastics and is the direct responsibility of Subcommittee [D20.30](#) on Thermal Properties.30.07).

Current edition approved June 1, 2020. Published June 2020. Originally approved in 1943. Last previous edition approved in 2014 as D746 – 14. DOI: 10.1520/D0746-20.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ *ISO Standards Handbook 21*, Vol 1. ISO Standards are available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

*A Summary of Changes section appears at the end of this standard